

Appendix B

Farm Scale and Central Digester Evaluation

Detailed economic evaluation of two cases – a farm scale digester and a centralized digester project to serve multiple dairies on a regional basis.

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Exhibit B-1 – ROI Summary Table

Summary of ROI for All Cases Studied					
	Income % of Expected				
	50%	75%	100%	125%	150%
500 PF	-4%	-1%	2%	4%	6%
500 MM	-10%	-7%	-5%	-3%	-2%
500 MT	-4%	-0%	3%	5%	8%
6075 PF	1%	5%	9%	13%	16%
6075 MM	-0%	4%	8%	11%	14%
6075 MT	5%	11%	16%	20%	25%

Exhibit B-2 – ROI Summary Chart

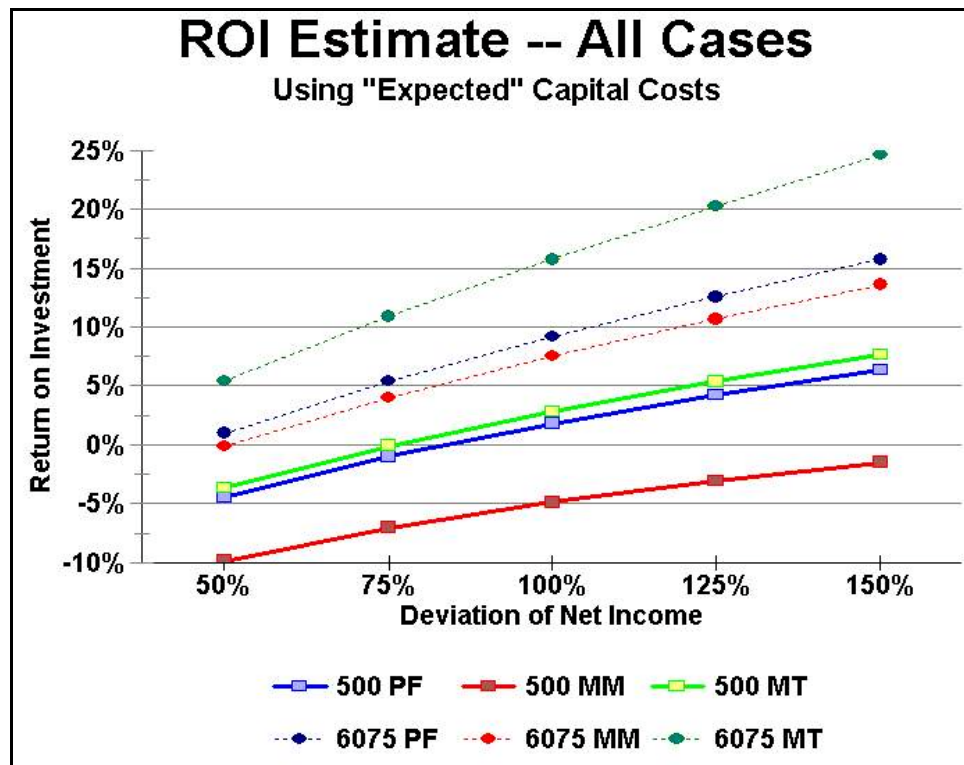
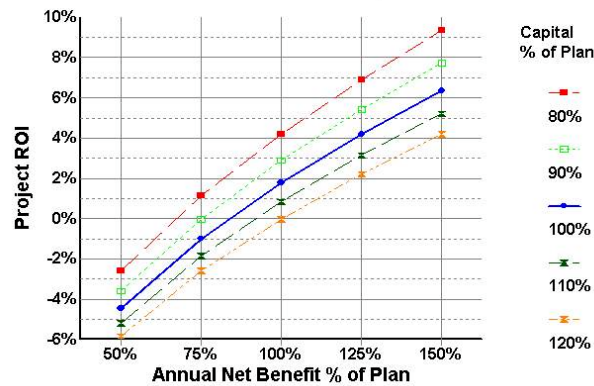
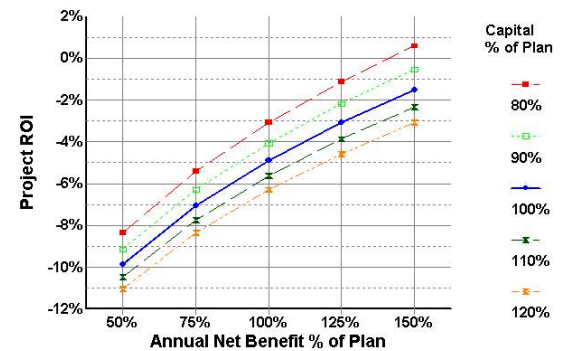


Exhibit B-3 – ROI Sensitivity Charts – Deviations in Capital Costs and Net Revenues

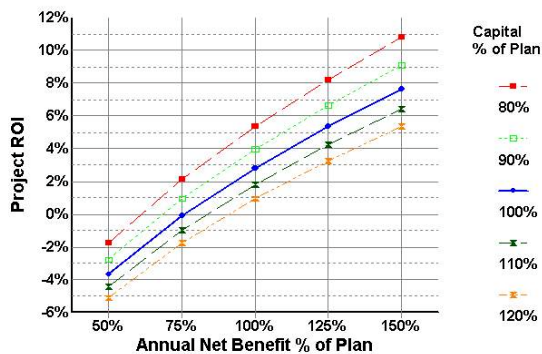
500 Cow Plug Flow (500 PF)
Project ROI Sensitivity
Benefit Deviation and Capital Cost



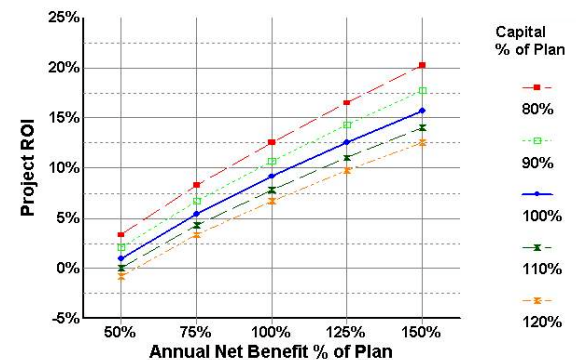
500 Cow Mixed Mesophilic (500 MM)
Project ROI Sensitivity
Benefit Deviation and Capital Cost



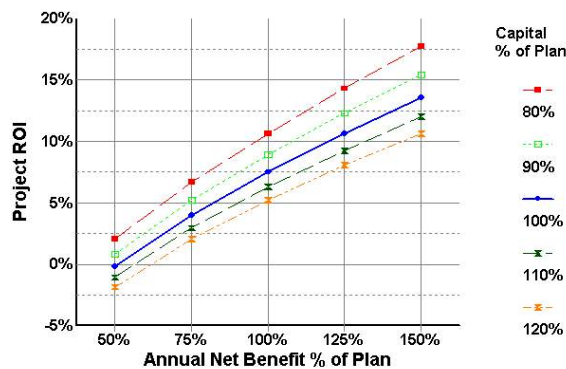
500 Cow Mixed Thermophilic (500 MT)
Project ROI Sensitivity
Benefit Deviation and Capital Cost



6075 Cow Plug Flow (6075 PF)
Project ROI Sensitivity
Benefit Deviation and Capital Cost



6075 Cow Mixed Mesophilic (6075 MM)
Project ROI Sensitivity
Benefit Deviation and Capital Cost



6075 Cow Mixed Thermophilic (6075 MT)
Project ROI Sensitivity
Benefit Deviation and Capital Cost

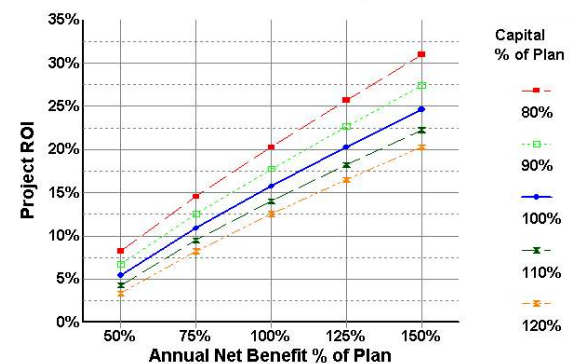


Exhibit B-4 – Single Farm Digester – Income Summary

Income Items -- Quantity and Price					
		<u>Units</u>		<u>Value</u>	<u>Annual</u>
Electricity Sale	519	MWh @	\$35.00		\$18,165
Production Tax Credit	519	MWh @	\$18.00		\$9,342
Green Tags	519	MWh @	\$20.00		\$10,380
BPA Reserve	519	MWh @	\$10.00		\$5,190
Carbon Credits	2,249	M Ton @	\$4.00		\$8,996
User Fee	500	Cows @	\$0.00		\$0
Residual Solids	1,075	Tons @	\$10.00		\$10,750
Liquid Fraction	1,077	000 gal @	\$0.00		\$0
					\$62,823

Exhibit B-5 – Single Farm Digester Pro-Forma Operating and Capital

Proforma Investment and Operating Statement						
Dairy --- PlugFlow1.79%						
Income			Expense			
Electricity			Operations			
Net metered Power	\$0	0%	Genset R&M			\$5,190
Demand	\$0	0%	Digester Operations			\$25,000
Grid sale	\$18,165	29%	Solid Residuals Handling			\$5,375
Power Based Incentive			Transportation			
Renewable Tax Credit	\$9,342	15%	Waste Inbound Hauling			\$0
Green Tags	\$10,380	17%				
BPA Reserve	\$5,190	8%			Total Expenses	\$35,565
Carbon Credits			Net Revenues			
	\$8,996	14%				\$27,258
User Fee			Capital			
	\$0	0%	Digester & Equipment			\$186,559
Nutrient Value			GeN Set & Interconnect			\$124,695
Residual Solids	\$10,750	17%	Solids Handling			\$46,501
Liquid Fraction	\$0	0%	Rolling Stock			\$0
			Land and Development			\$0
Total Revenues	\$62,823	100%	Engineering & Conting.			\$97,286
			Other			\$0
			Total			\$455,041

Exhibit B-6 – Single Farm Digester Detailed Sensitivity Analysis

Economic Sensitivity of Key Project Factors							
		Dairy --- PlugFlow	1.79%				
							Minimum Value for
							ROI Target^{***}
Factor	Base Value		Change By	Effect on			
				Income	Capital	ROI	10%
Project Size	500	Milkers	100	\$10,452	\$95,940	1.41%	1,163
External Power Price	\$0.035	Per Kwh	\$0.010	\$5,190		1.86%	\$0.088
Net Metering power Price	\$0.065	Per Kwh	\$0.010				
"Green Tag" Value	\$0.020	Per Kwh	\$0.005	\$2,595		0.95%	\$0.073
User Fee		Per Milker	\$5.00	\$2,500		0.92%	\$52.45
Organics Sale Price	\$10.00	Per Ton Bulk	\$5.00	\$5,375		1.93%	\$34.40
Manure Transport Cost		Per Ton	\$0.10	(\$1,540)		-0.59%	(\$1.62)
Gas Production Factor	5.00	Ft3 / #VS	0.25	\$2,344	\$2,281	0.81%	8.35
GenSet Efficiency	30%		1%	\$1,263	\$1,521	0.43%	56%
Additional Capital		One Time	\$50,000		\$50,000	-1.05%	(\$216,027)
Additional Income		Annual	\$5,000	\$5,000		1.80%	\$27,339
Nutrient Rich Water		Per 000 Gal					

Exhibit B-7 – Central Digester - Income Summary

Income Items -- Quantity and Price					
		<u>Units</u>		<u>Value</u>	<u>Annual</u>
Electricity Sale		10,386	MWh @	\$35.00	\$363,510
Production Tax Credit		10,386	MWh @	\$18.00	\$186,948
Green Tags		10,386	MWh @	\$20.00	\$207,720
BPA Reserve		10,386	MWh @	\$10.00	\$103,860
Carbon Credits		38,576	M Ton @	\$4.00	\$154,304
User Fee		6,075	Cows @	\$30.00	\$182,250
Residual Solids		26,945	Tons @	\$20.00	\$538,891
Liquid Fraction		17,098	000 gal @	\$5.00	\$85,491
					\$1,822,973

Exhibit B-8 – Central Digester - Pro-Forma Operating and Capital

Proforma Investment and Operating Statement									
Dairy --- Thermophilic15.72%									
Income				Expense					
Electricity				Operations					
Net metered Power	\$0	0%		Genset R&M	\$103,860	9%			
Demand	\$0	0%		Digester Operations	\$300,000	26%			
Grid sale	\$363,510	20%		Solid Residuals Handling	\$134,723	12%			
Power Based Incentive				Transportation					
Renewable Tax Credit	\$186,948	10%		Waste Inbound Hauling	\$151,131	13%			
Green Tags	\$207,720	11%							
BPA Reserve	\$103,860	6%		Total Expenses	\$689,713	61%			
Carbon Credits	\$154,304	8%		Net Revenues	\$1,133,260	100%			
User Fee	\$182,250	10%		Capital					
				Digester & Equipment	\$1,965,102	29%			
Nutrient Value				GeN Set & Interconnect	\$1,470,931	22%			
Residual Solids	\$538,891	30%		Solids Handling	\$1,038,891	15%			
Liquid Fraction	\$85,491	5%		Rolling Stock	\$475,000	7%			
				Land and Development	\$500,000	7%			
Total Revenues	\$1,822,973	100%		Engineering & Conting.	\$1,370,328	20%			
				Other	\$0	0%			
				Total	\$6,820,252	100%			

Exhibit B-9 – Central Digester - Detailed Sensitivity Analysis

Economic Sensitivity of Key Project Factors							
		Dairy --- Thermophilic	15.72%				Minimum
							Value for
Factor	Base Value		Change By	Effect on			ROI Target**
				Income	Capital	ROI	10%
Project Size	6,075	Milkers	1200	\$283,113	\$484,702	3.05%	4,117
External Power Price	\$0.035	Per Kwh	\$0.010	\$103,860		1.69%	\$0.003
Net Metering power Price	\$0.065	Per Kwh	\$0.010				
"Green Tag" Value	\$0.020	Per Kwh	\$0.005	\$51,930		0.85%	(\$0.012)
User Fee	\$30.00	Per Milker	\$5.00	\$30,375		0.50%	(\$24.60)
Organics Sale Price	\$20.00	Per Ton Bulk	\$5.00	\$134,723		2.18%	\$7.70
Manure Transport Cost	\$0.60	Per Ton	\$0.10	(\$25,188)		-0.41%	\$1.81
Gas Production Factor	6.00	Ft3 / #VS	0.25	\$38,020	\$43,226	0.50%	3.50
GenSet Efficiency	35%		1%	\$21,662	\$29,640	0.27%	17%
Additional Capital		One Time	\$500,000		\$500,000	-1.28%	\$2,886,962
Additional Income		Annual	\$50,000	\$50,000		0.82%	(\$332,111)
Nutrient Rich Water (1/3)	\$5.00	Per 000 Gal	\$1.00	\$17,098		0.28%	(\$14.37)

